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Maximo Automation Scripts Done Right

10 practical tips to improve your automation scripts



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Maximo Automation Scripts Done Right

10 practical tips to improve your automation scripts

1. Looping MboSet
2. Avoid using field flags
3. Avoid MxServer.getMboSet()
4. Close MboSet()
5. Use Logging
6. Avoid using launchpoint variables
7. Launchpoint is IMPORTANT!
8. Group scripts by object
9. Use functions
10. Library scripts

Tip #1

Looping MboSet

Looping through MboSet




```
woSet = mbo.getMboSet("WORKORDER")
for i in range(0, woSet.count()):
  wo = woSet.getMbo(i)
  print "Workorder ", wo.getString("WONUM")
```




```
woSet = mbo.getMboSet("WORKORDER")
wo = woSet.moveFirst()
while (wo):
  print "Workorder ", wo.getString("WONUM")
  wo = woSet.moveNext()
```

Best way to loop through an MboSet

Tip #2

Avoid using field flags

NOACCESSCHECK/NOVALIDATION/NOACTION

Field Flags

Use Mbo field flags only if necessary

- **NOACCESSCHECK** – Allows to change readonly fields.
- **NOVALIDATION** – Skip validate event. Allows to set values that are not permitted overriding business rules.
- **NOACTION** – Skip action event. Can be used to avoid automatic population of other fields.
- **NOVALIDATION_AND_NOACTION** - Skip validate and action event.




```
mbo.setValue("PRIORITY", mbo.NOVALIDATION_AND_NOACTION + mbo.NOACCESSCHECK)
```

Tip #3

Avoid MxServer.getMboSet()

Avoid MxServer.getMboSet()

MXServer.getMXServer().getMboSet()

- Breaks transactions >> requires explicit MboSet.save()
- MboSet must be manually closed




```
from psdi.server import MXServer
woSet = MXServer.getMXServer().getMboSet("WORKORDER", mbo.getUserInfo())
woSet.setWhere("WONUM='1000'")
```

mbo.getMboSet()

- More concise and clear >> relationship is defined in Database Configuration
- Transaction-safe >> automatically saves or rollback
- No need to close the MboSet




```
woSet = mbo.getMboSet("WORKORDER")
```

Avoid MxServer.getSystemUserInfo()

MXServer.getSystemUserInfo()

- Use current system user's information context
- May lead to memory leaks and system dumps

```
userInfo = MXServer.getMXServer().getSystemUserInfo()
woSet = MXServer.getMXServer().getMboSet("WORKORDER", userInfo)
```



mbo.getUserInfo()

- Use current user's information context
- Released when user’s session expires

```
userInfo = mbo.getUserInfo()
woSet = MXServer.getMXServer().getMboSet("WORKORDER", userInfo)
```



Tip #4

Close MboSet()

Closing MboSet

- No need to close when using *mbo.getMboSet()*
- Should always close when using *MXServer.getMXServer().getMboSet()*
- *MboSet.**clear()*** release the data from memory and closes the set

```
from psdi.server import MXServer

woSet = MXServer.getMXServer().getMboSet("WORKORDER", mbo.getUserInfo())
woSet.setWhere("WONUM='1000’”)
wo = woSet.moveFirst()
while (wo):
   …
   wo = woSet.moveNext()
woSet.clear()
```

Tip #5

Use Logging

with a custom logger

Logging

- Define a custom logger for all your scripts
- Initialize logger using *service.getLogger* (no need to import MxLogger)

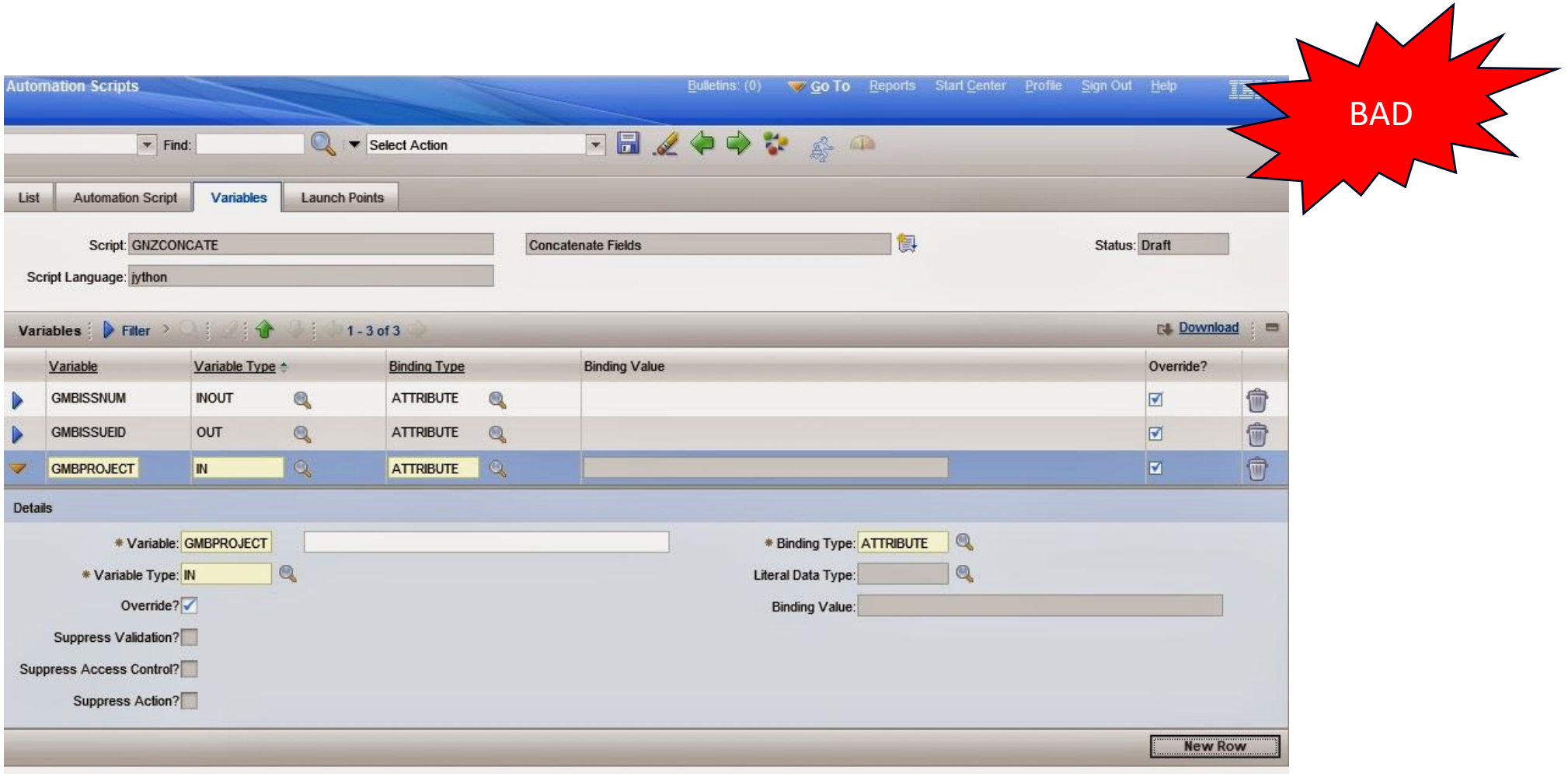
```
logger = service.getLogger("maximo.cx")

logger.warn("This is a warning message")
logger.info("This is an informational message")
logger.debug("This is useful for troubleshooting")
```

Tip #6

Avoid using launchpoint variables

Avoid using launchpoint variables



Why I hate automation script variables binding

Avoid using launchpoint variables

- Less readable - Cannot understand just reading the code
- More complex to create and migrate - Variables must be defined in Maximo

BAD

```
owner = mbo.getOwner()
mydesc = owner.getString("DESCRIPTION")
```

What is ‘mydesc’ in this code?
Is a variable?
Is it bound to a database field?

GOOD

```
owner = mbo.getOwner()
mbo.setValue("MYDESC", owner.getString("DESCRIPTION"))
```

Tip #7

Launchpoint is IMPORTANT!

Launchpoint is IMPORTANT!

Tip #7.1

Identify the object/attribute launchpoint before writing the code

Tip #7.2

Link to the event that must trigger the action/validation

Object Launchpoints

- **Initialize** – MBO initialization. Executed every time MBO is fetched from the database.
  - Avoid heavy logic
  - Never set values in persistent fields on this kind of scripts
- **Validate application** – Validate MBO before saving.
- **Before Save** – Implement validations/actions to be performed before saving
- **After Save** – Avoid using it
- **After Commit** – Avoid using it
- **Allow object creation** - Indicates whether new Maximo business objects can be created.
- **Allow object deletion** - Indicates whether Maximo business objects can be deleted.

Attribute Launchpoints

- **Retrieve list** - Retrieves a list of valid values for the attribute's field. For example, in an invoice, you can set up the supplier field to return a list of approved vendors.
- **Initialize access restriction** - Sets the access level for the attribute's field. For example, you can change the access level for an attribute's field from read/write access to read-only access.
- **Initialize value** - Sets the value for the attribute's field.
- **Validate** - Checks whether the value in the attribute's field is valid. For example, you can check whether a telephone number is properly formatted or contains enough digits to constitute a valid number.
- **Run action** - Runs an action that is based on the value that is in the attribute's field.

Tip #8

Group scripts by object

…and naming conventions

Object-oriented scripting structure (MBO-like)

- Object: ASSET - Script: **ASSET (or XXX_ASSET)**

- Object launchpoint: [OBJNAME].[EVNAME]
  - Before Save: **ASSET.SAVE**
  - Initialize Object: **ASSET.INIT**
  - Allow Object Creation: **ASSET.ADD**

- Attribute launchpoint: [OBJNAME].[ATTRNAME].[EVNAME]
  - Validate STATUS: **ASSET.STATUS.VAL**
  - Retrieve List: **ASSET.STATUS.LIST**

- Action launchpoint: [OBJNAME].[ACTION]
  - Validate STATUS: **ASSET.CHANGESTATUS**

Object-oriented scripting structure (MBO-like)

```
Script: ASSET

# Object - Initialize
if launchPoint=="ASSET.INIT":

# Attribute - Initialize Access Restriction
if launchPoint=="ASSET.STATUS.INITACC":

# Object – Initialize (onadd)
if launchPoint=="ASSET.INIT":
  if onadd:

# Object – Before Save
if launchPoint=="ASSET.SAVE":

# Object – Before Save (ondelete)
if launchPoint=="ASSET.SAVE":
  if ondelete:

# Object – Validate Application
if launchPoint=="ASSET.APPVAL":
```

```
package psdi.app.asset;
public class Asset extends StatefulMbo implements  ...
{
  public void init() throws MXException


  public void initFieldFlagsOnMbo(String attrName) throws MXException


  public void add() throws MXException, RemoteException



  public void save() throws MXException, RemoteException


  public void delete() throws MXException, RemoteException



  public void appValidate() throws MXException, RemoteException
```

Tip #9

Use functions

...modular programming was invented in the 1970s

Use functions to make script more readable

Move complex logic into separate functions

```
def getDescription():
    d = mbo.getString("ASSETNUM")
    d += "-" + mbo.getString("ASSETTYPE")
    d += "-" + mbo.getString("SERIALNUM")
    return d

#-----------------------------------------------
desc = getDescription()
mbo.setValue("DESCRIPTION", desc)
```

Tip #10

Library scripts

scripting like a pro!

Using service.invokeScript

```
# CX_TESTLIB – getDescription

d = mbo.getString("ASSETNUM")
d += "-" + mbo.getString("ASSETTYPE")
d += "-" + mbo.getString("SERIALNUM")
```

```
# CX_TEST

from java.util import HashMap

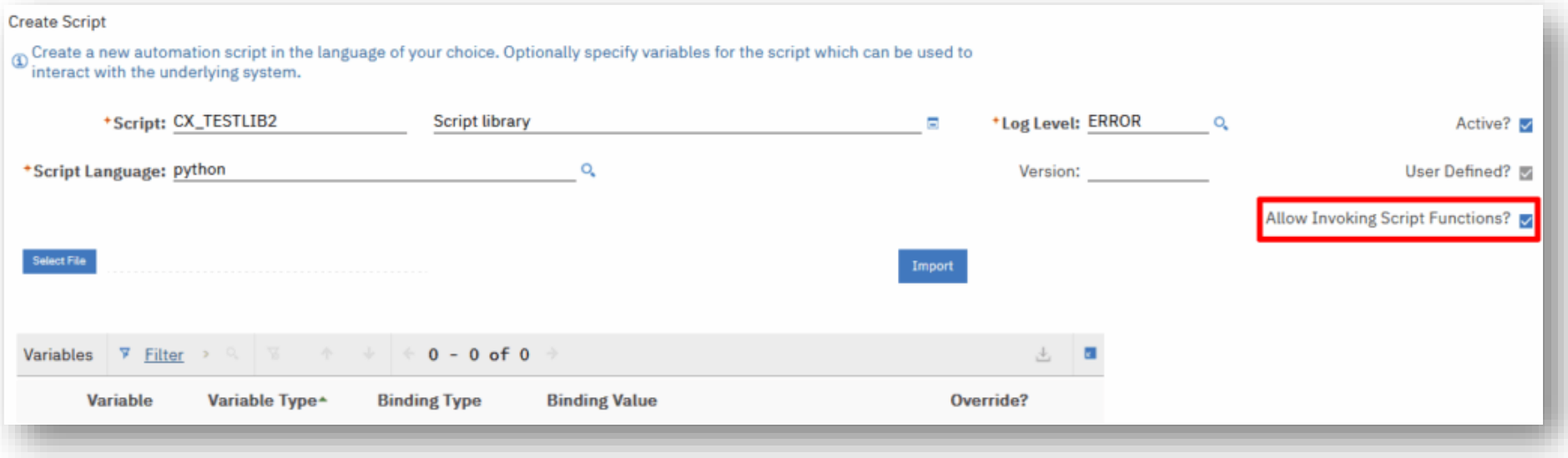
map = HashMap()
map.put("mbo", mbo)
map = service.invokeScript("CX_TESTLIB")
desc = map.get("d")

mbo.setValue("DESCRIPTION", desc)
```

https://bportaluri.com/blog/2025/11/maximo-script-library/

The magic flag

- The **Allow Invoking Script Functions** flag allows to call functions from other scripts



https://bportaluri.com/blog/2025/11/maximo-script-library/

Using Library Script

```
# CX_TESTLIB

def getDescription(service, mbo):
    d = mbo.getString("ASSETNUM")
    d += "-" + mbo.getString("ASSETTYPE")
    d += "-" + mbo.getString("SERIALNUM")
    return d
```

```
# CX_TEST

desc = service.invokeScript("CS_TESTLIB", "getDescription", [service, mbo])
mbo.setValue("DESCRIPTION", desc)
```

Tip #11

Let's Do It!



Q&A

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Bonus Tips

Tip #12

Use SqlFormat class

Use SqlFormat class

- Building the where clause using concatenation of strings can fail if string contains SQL reserved characters like ' or %




```
from psdi.server import MXServer
wo = "T41042"
siteid = "TEXAS"
woSet = MXServer.getMXServer().getMboSet("WORKORDER", mbo.getUserInfo())
woSet.setWhere("wonum='" + wo + "' and siteid='" + siteid + "'")
wo = woSet.getMbo(0)
if wo:
    responseBody = wo.getString("DESCRIPTION")
```

Use SqlFormat class

- Avoid SQL syntax errors
- Prevent SQL injection
- Can be faster




```
from psdi.server import MXServer
from psdi.mbo import SqlFormat
wo = "T41042"
siteid = "TEXAS"
sqf = SqlFormat("wonum=:1 and siteid=:2")
sqf.setObject(1, "WORKORDER", "WONUM", wo)
sqf.setObject(2, "WORKORDER", "SITEID", siteid)
woSet = MXServer.getMXServer().getMboSet("WORKORDER", mbo.getUserInfo())
woSet.setWhere(sqf.format())
wo = woSet.getMbo(0)
if wo:
    responseBody = wo.getString("DESCRIPTION")
```

Tip #13

Checking for nulls

Null values

- When a field is empty (null value)
  - *getString* method returns empty string if field is empty
  - *getInt*, *getLong*, *getDouble* return "0"
- Use *mbo.isNull()* method to check for null values

```
if mbo.getString("DESCRIPTION")=="":
    # dosomething

if mbo.isNull("DESCRIPTION"):
    # dosomething
```

Check for nulls

- Avoid null pointer exceptions checking for null values when fetching related MboSet

```
loc = mbo.getMboSet("LOCATION").moveFirst()
if loc:
  locdesc = loc.getString("DESCRIPTION")
  ...
```

Tip #14

Use Maximo Java APIs

Maximo Java APIs

- https://bportaluri.com/wp-content/MaximoJavaDocs7612/

- Bookmark links below
  - Mbo
  - MboSet
  - MxServer
  - ScriptService

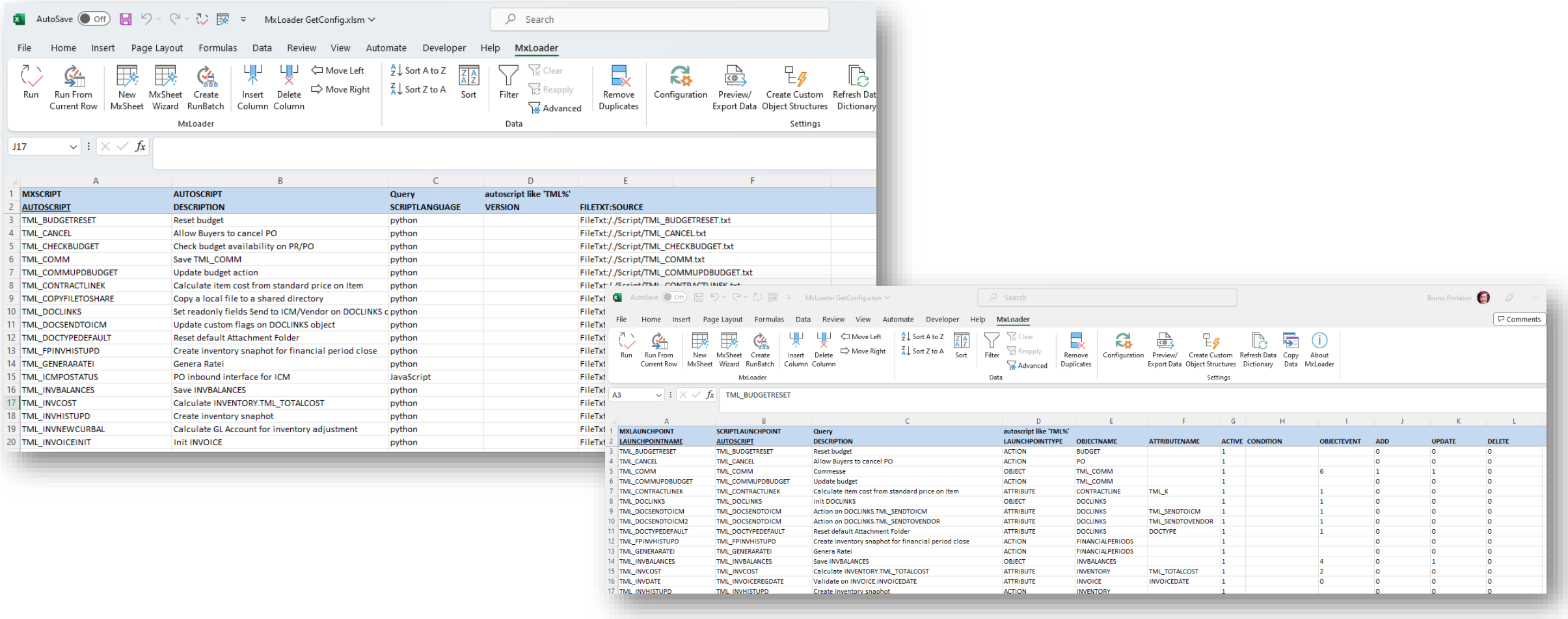
Tip #15

Use a code versioning tool

or, at least, backup your scripts

Use MxLoader to dump all scripts

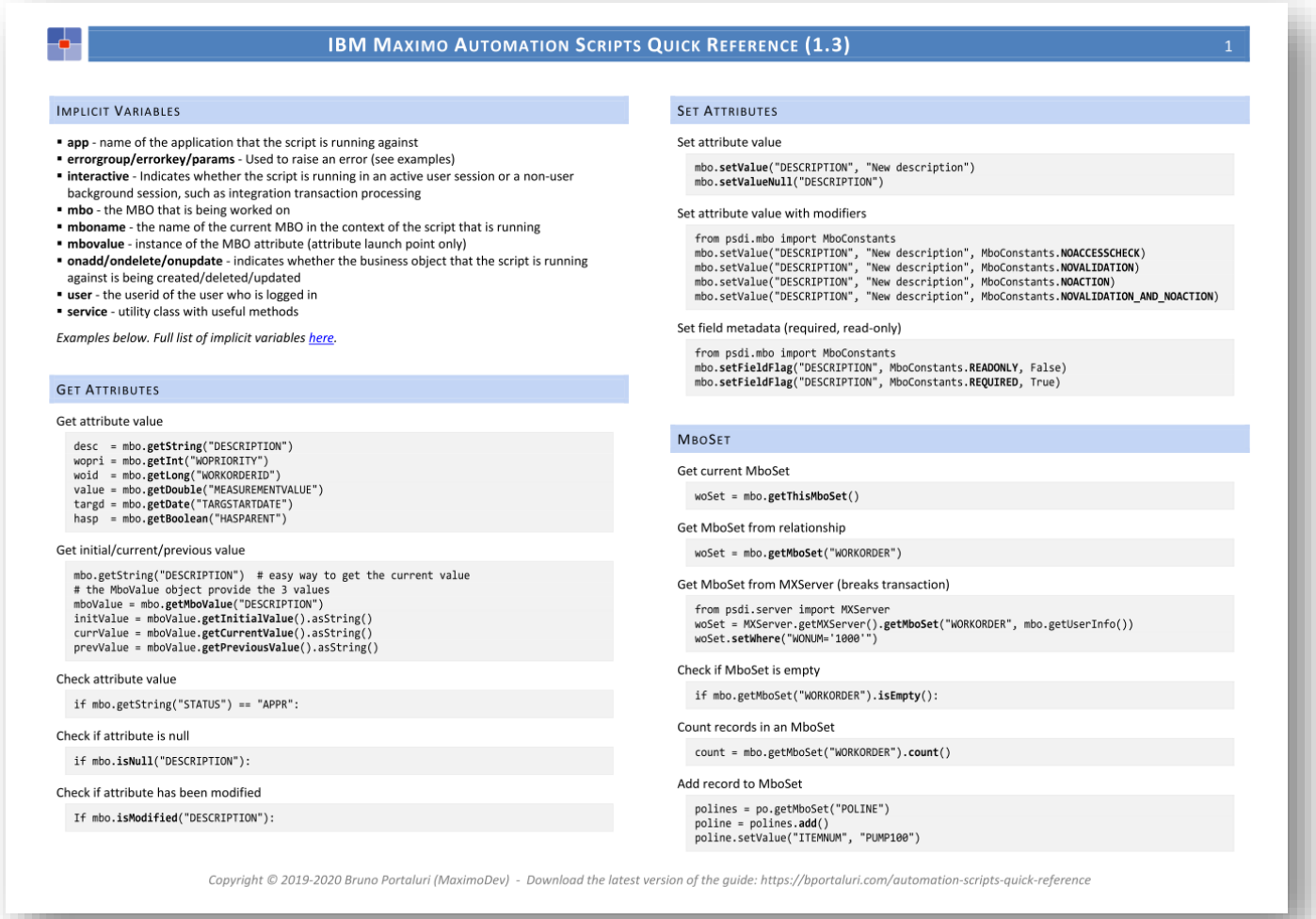
- Periodically extract all scripts and save locally



Tip #16

Download the Maximo Automation Script Quick Reference

Maximo Automation Script Quick Reference



IBM Maximo Automation Scripts Quick Reference (1.3)

Implicit Variables

- **app** - name of the application that the script is running against
- **errorgroup/errorkey/params** - Used to raise an error (see examples)
- **interactive** - Indicates whether the script is running in an active user session or a non-user background session, such as integration transaction processing
- **mbo** - the MBO that is being worked on
- **mboname** - the name of the current MBO in the context of the script that is running
- **mbovalue** - instance of the MBO attribute (attribute launch point only)
- **onadd/ondelete/onupdate** - indicates whether the business object that the script is running against is being created/deleted/updated
- **user** - the userid of the user who is logged in
- **service** - utility class with useful methods

Examples below. Full list of implicit variables here.

Get Attributes

Get attribute value

```
desc  = mbo.getString("DESCRIPTION")
wopri = mbo.getInt("WOPRIORITY")
woid  = mbo.getLong("WORKORDERID")
value = mbo.getDouble("MEASUREMENTVALUE")
targd = mbo.getDate("TARGSTARTDATE")
hasp  = mbo.getBoolean("HASPARENT")
```

Get initial/current/previous value

```
mbo.getString("DESCRIPTION")  # easy way to get the current value
# the MboValue object provide the 3 values
mboValue = mbo.getMboValue("DESCRIPTION")
initValue = mboValue.getInitialValue().asString()
currValue = mboValue.getCurrentValue().asString()
prevValue = mboValue.getPreviousValue().asString()
```

Check attribute value

```
if mbo.getString("STATUS") == "APPR":
```

Check if attribute is null

```
if mbo.isNull("DESCRIPTION"):
```

Check if attribute has been modified

```
If mbo.isModified("DESCRIPTION"):
```

Set Attributes

Set attribute value

```
mbo.setValue("DESCRIPTION", "New description")
mbo.setValueNull("DESCRIPTION")
```

Set attribute value with modifiers

```
from psdi.mbo import MboConstants
mbo.setValue("DESCRIPTION", "New description", MboConstants.NOACCESSCHECK)
mbo.setValue("DESCRIPTION", "New description", MboConstants.NOVALIDATION)
mbo.setValue("DESCRIPTION", "New description", MboConstants.NOACTION)
mbo.setValue("DESCRIPTION", "New description", MboConstants.NOVALIDATION_AND_NOACTION)
```

Set field metadata (required, read-only)

```
from psdi.mbo import MboConstants
mbo.setFieldFlag("DESCRIPTION", MboConstants.READONLY, False)
mbo.setFieldFlag("DESCRIPTION", MboConstants.REQUIRED, True)
```

MboSet

Get current MboSet

```
woSet = mbo.getThisMboSet()
```

Get MboSet from relationship

```
woSet = mbo.getMboSet("WORKORDER")
```

Get MboSet from MXServer (breaks transaction)

```
from psdi.server import MXServer
woSet = MXServer.getMXServer().getMboSet("WORKORDER", mbo.getUserInfo())
woSet.setWhere("WONUM='1000'")
```

Check if MboSet is empty

```
if mbo.getMboSet("WORKORDER").isEmpty():
```

Count records in an MboSet

```
count = mbo.getMboSet("WORKORDER").count()
```

Add record to MboSet

```
polines = po.getMboSet("POLINE")
poline = polines.add()
poline.setValue("ITEMNUM", "PUMP100")
```

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